IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	)	
Ralph R. Sawtell et al.	)	Examiner Janelle A. Combs-Morillo
Serial No. 09/916,350	)	Group Art Unit 1742
Confirmation No. 7564	)	Attorney Docket No. 00-1684
Filed July 30, 2001	)	Response Under 37 C.F.R. 1.192 Expedited Procedure Examining Group 1700
For Alloy Composition for Making Blister-Free Aluminum Forgings And Parts Made Therefrom	)	

APPEAL BRIEF

September 25, 2003

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This Appeal Brief is in support of the Notice of Appeal filed on June 25, 2003 in the above-identified patent application. The Notice of Appeal was received in the United States Patent and Trademark Office on June 25, 2003. The Appeal Brief is timely filed with a Petition for One-Month Extension of Time bringing the due date to September 25, 2003. The Notice of Appeal appeals the final rejection of claims 1-27. No oral hearing is requested herewith.

The headings used hereinafter and the subject matter set forth under each heading is in accordance with 37 C.F.R. §1.192(c).

I. REAL PARTY IN INTEREST

Ralph R. Sawtell, Paul J. Ainsworth, and Samuel C. Lyon are the only inventors of the invention described and claimed in the above-identified application. These inventors have assigned all rights, title, and interest in the invention of the application to Alcoa Inc. Alcoa Inc. as evidenced in the Assignment recorded January 15, 2002 on reel 012492, frame 0455-0459 and as such, is the real party in interest in this appeal.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals or interferences known to the Appellants, the Appellants' legal representative or Assignee, which will directly affect or be directly affected by, or have a bearing on the Board's decision in this pending Appeal.

III. STATUS OF CLAIMS

Claims 1-27 remain pending in the present application and are currently rejected.

Particularly, claims 1-7 and 11 stand finally rejected under 35 U.S.C. §102(b) as being anticipated by the teachings of "Metals Handbook: Desk Edition" (hereinafter "Metals Handbook"), pp 426-427, and 449-450. Claims 8-27 stand finally rejected under 35 U.S.C. §103(a) for obviousness over Metals Handbook, pp 426-427, and 449-450 alone or in view of U.S. Patent No. 5,879,475 to Karabin (hereinafter "Karabin").

Claims 1-27 are reproduced in Appendix X which is attached hereto.

IV. STATUS OF AMENDMENTS

No response after the final Office Action dated February 26, 2003 was submitted in this case. The claims on appeal are claims 1-10, 12-18, 20-25 and 27 as originally filed and claims 11, 19 and 26 as amended in the Amendment of November 27, 2002.

V. SUMMARY OF THE INVENTION

The present invention is directed to an improved aluminum alloy with noticeably reduced susceptibility to high temperature oxidation and the blistering effects associated therewith. Additionally, this alloy exhibits improved fracture toughness performance. The claims on appeal are directed to an alloy having about 0.65-0.9 wt.% silicon, about 4-4.7 wt.% copper, about 0.6-0.9 wt.% manganese, about 0.35-0.55 wt.% magnesium, up to about 0.25 wt.% zinc, up to about 0.15 wt.% iron, up to about 0.15 wt.% titanium, up to about 0.1 wt.% chromium, and up to about 0.001 wt.% beryllium, the balance aluminum, incidental elements

and other impurities. More preferably, this alloy contains about 0.7-0.85 wt.% silicon, about 4.1-4.5 wt.% copper, about 0.65-0.85 wt.% manganese, about 0.4-0.5 wt.% magnesium, about 0.14 wt.% iron or less, and a balance of aluminum, incidental elements and impurities. This alloy is especially suitable to make aerospace wheel forgings, more particularly inboard aircraft wheels, and various brake components, like a brake piston housing.

By a reduction in the amount of iron present, and tight compositional range limits for this alloy's other main alloying components a "high purity" state of the alloy is achieved. In this "high purity" state, noticeable improvements to blistering resistance, fracture toughness, tensile elongation properties, and significantly lower scrap rates are achievable at commercial production levels.

VI. ISSUES

The issues on appeal include:

1. Are claims 1-7 and 11 anticipated under 35 U.S.C. §102(b) by Metals Handbook, pp 426-427, 449-450?

2. Are claims 8-27 obvious under 35 U.S.C. §103(a) over Metals Handbook pp 426-427, 449-450 alone or in view of Karabin?

VII. GROUPING OF CLAIMS

Claims 1-27 stand or fall together and are grouped accordingly.

The support for consideration of the grouping of claims is addressed in the arguments set forth in the Arguments section of this Appeal Brief.

VIII. ARGUMENTS

The arguments made in the November 27, 2002 Amendment to the August 27, 2002 Office Action are hereby incorporated by reference.

Each issue presented for review is addressed hereinafter under the appropriate heading:

I. CLAIMS 1-7 AND 11 ARE NOT ANTICIPATED UNDER 35 U.S.C. §102(B) BY METALS HANDBOOK, PP. 426-427, 449-450

As indicated above, the independent claims are directed to an aluminum alloy, a forged aircraft wheel and a forged vehicular brake component having reduced susceptibility to high temperature oxidation. The alloy includes about 0.65-0.9 wt.% silicon, 4-4.7 wt.% copper,

0.6-0.9 wt.% manganese, 0.35-0.55 wt.% magnesium, up to about 0.15 wt.% iron, and a balance of aluminum, incidental elements and impurities.

In rejecting claims 1-7 and 11, the Examiner contends that the Metals Handbook Table 1, p. 427 discloses a composition having overlapping ranges with the claimed composition. The composition cited by the Examiner is AA2214 and includes 0.5-1.2 wt.% silicon, 0.3 containing wt.% iron, 3.9-5.0 wt.% copper, 0.40-1.2 wt.% manganese, 0.20-0.8 wt.% magnesium, up to 0.10 wt.% chromium, up to 0.25 wt.% zinc, and up to 0.15 wt.% titanium.

While there may be overlap in ranges between the AA2214 composition and the claimed composition in the independent claims, Appellants respectfully disagree with the Examiner's anticipation rejection. The Metals Handbook does not teach or suggest an alloy composition having reduced susceptibility to high temperature oxidation and, moreover, does not teach or suggest a purer alloy than AA2214.

The aluminum alloy field in particular has several examples of alloys classified within the same family that share "close" chemical compositions, and yet are completely distinct with respect to properties and marketable end uses. For example, a number of alloys that share overlapping compositional ranges but specify narrower ranges and/or higher purity forms to achieve certain property improvements have been produced and, furthermore, separately patented. See, for example, the family of 7050 alloys, with its closely related 7150 variants. Alloys AA2014 and AA2214 are both members of the AA2014 family, but they are both distinct alloys. In particular, AA2214 is a higher purity version of AA2014 aluminum.

As indicated previously, the claimed composition is an alloy composition of a higher purity than the AA2214 composition. Materials of higher purity are deemed to be novel due to differences between pure and impure materials. MPEP §2144.04, VII. Due to these differences, the courts have stated that the issue is whether the claims to a pure material are unobvious over the prior art. MPEP §2144.04, VII, citing *In re Bergstrom*, 427 F.2d 1394, 166 USPQ 256 (CCPA 1970). Factors that may be considered in determining whether a purified form of an old product is obvious include utility of the claimed composition with respect to the material of the prior art, as well as suggestion of the form or structure of the claimed material in the prior art. *In re Coffer*, 354 F.2d 664, 148 USPQ 268 (CCPA 1966). The higher purity alloy of the claimed composition is not taught by or rendered obvious by the AA2214 composition of

the Metals Handbook, as will be discussed in more detail hereinafter.

The claimed alloy composition is a higher purity version of the AA2214 composition and therefore is not anticipated by the AA2214 composition. By significantly reducing the iron content in the claimed composition, as indicated in paragraph 6 of the specification, a higher purity aluminum alloy composition distinct from AA2214 is achieved. The control of ranges for the other alloying components in the claimed composition also aids in achieving higher purity of the claimed composition. As a consequence of utilizing the higher purity claimed composition with a lower iron content, a distinct ingot structure is achieved when compared to the AA2014 and AA2214 ingots which in turn improve properties such as fracture toughness. The refined microstructure of these ingots may include fewer nucleation sites for hydrogen induced porosity and thereby allow for a purer alloy. Thus, by reducing the iron content, Appellants achieve a higher purity alloy when compared to AA2014 and AA2214.

Furthermore, the higher purity claimed composition achieves unexpected properties that are not characteristic of the AA2014/AA2214 alloy family members. In particular, by reducing the total amount of iron, the higher purity claimed alloy composition demonstrates higher tensile elongation, reduced susceptibility to higher temperature oxidation, lower occurrences of blistering and surface defects, and increased fracture toughness when compared to other alloys in the AA2014/AA2214 family. The AA2214 composition of the Metals Handbook clearly does not teach or suggest an alloy composition that reduces the susceptibility to high temperature oxidation or has the improved properties.

Consequently, to achieve an even purer alloy, Appellants subjected their inventive composition to additional purification treatment steps. With the additional processing steps, Appellants achieve a preferred composition with about one-half the iron content of AA2214, or one quarter the level of iron originally set forth in "grandparent" AA2014. For the foregoing reasons, the higher purity alloy composition in independent claim 1 is not anticipated or rendered obvious over the AA2214 alloy composition disclosed in the Metals Handbook.

Additionally, the Metals Handbook does not teach or suggest the claimed alloy composition having a reduced susceptibility to high temperature oxidation for use in manufacturing a forged part as in dependent claim 7. Also, the Metals Handbook does not teach or suggest an alloy composition having an improved T6 fracture toughness greater than

21 ksi √in. as in dependent claim 11.

Claims 2-7 and 11 depend directly or indirectly from independent claim 1 and further define the improved or higher purity alloy of the present invention and further distinguish the claimed invention from AA2214 disclosed in the Metals Handbook.

II. *CLAIMS 8-27 ARE NOT OBVIOUS UNDER 35 U.S.C. §103(a) OVER THE METALS HANDBOOK ALONE OR IN VIEW OF U.S. PATENT NO. 5,879,475 TO KARABIN.*

The Examiner states that it would have been obvious to one of ordinary skill in the art to combine the AA2214 alloy composition of the Metals Handbook with the teachings of Karabin for use in similar 2XXX series alloys for forged aircraft wheels and various brake component applications. Appellants respectfully disagree.

Independent claim 12 is directed to a forged aircraft wheel having reduced susceptibility to high temperature oxidation with the composition of independent claim 1. Independent claim 27 is directed to a forged vehicle or brake component having reduced susceptibility to high temperature oxidation with the composition of independent claim 1.

Karabin discloses aerospace alloy products having improved strength and fracture toughness. The alloy is directed to 2XXX series aluminum alloy products with little to no constituents.

Claims 8-27 are not rendered obvious by the AA2214 composition of the Metals Handbook alone or combined with the Karabin patent for the same reasons as discussed hereinabove with respect to claims 1-7 and 11. In particular, Appellants have demonstrated that the higher purity claimed composition of the independent claims having reduced susceptibility to high temperature oxidation achieve unexpected results. As disclosed in paragraph 15 of the specification, in a series of experiments involving variations of the alloy AA2014, including AA2214, the higher purity claimed composition includes lower iron content to improve fracture toughness, tensile elongation performance, as well as a decrease in the occurrence of high temperature oxidation. While other alloys of the AA2014/AA2214 family exhibit pores and blisters associated with high temperature oxidation which requires removal by surface grinding and machining operations, such steps are eliminated by use of the higher purity alloy of the independent claims. The AA2214 composition of the Metals Handbook fails to teach or suggest using an iron content of 0.15 wt % to achieve a higher purity alloy, as well as to reduce the

susceptibility of the high temperature oxidation, increase fracture toughness, as well as tensile elongation performance.

Karabin fails to add any teachings to the deficiencies of the AA2214 alloy composition of the Metals Handbook to render the present claims obvious. In particular, Karabin does not teach or suggest a higher purity composition as in the independent claims 1, 12 and 20 for reducing the susceptibility to high temperature oxidation, increasing fracture toughness, and increasing tensile elongation properties.

In fact, there is no suggestion or motivation to combine the teachings of the forged wheels and components of Karabin with the AA2214 alloy composition of the Metals Handbook. In particular, the alloy composition of Karabin is limited to the additions of copper, magnesium, manganese, silver, zirconium, silicon and iron by use of the phrase "consisting essentially of". The composition in the Metals Handbook rather discloses the inclusion of additional elements such as titanium, as well as zinc and others. In addition to not including additional elements such as zinc in the AA2214 composition, column 5, lines 1-3, of Karabin clearly states that the alloys of Karabin preferably are substantially free of titanium. Therefore, Karabin teaches away from the AA2214 alloy composition of the Metals Handbook and accordingly, there would be no motivation to combine the two references and any such combination would fail to render the present invention obvious.

Also, as indicated in the specification, prior to the adoption of the claimed higher purity alloy composition, scrap rates in the manufacture of aircraft wheels from AA2014/AA2214 aluminum averaged 16% per year for the previous 3 years. In addition to scrapped wheels too damaged to recover by rework, other wheels required additional processing steps (including sanding, repolishing) prior to their release to the ultimate consumer of such goods. Through the manufacture of parts from the presently claimed alloy, scrap rates have been substantially reduced to practically 0%.

Thus, Appellants' claimed higher purity alloy has virtually eliminated a significant cost and processing problem associated with the AA2014/AA2214 alloy family. The intentional reduction of the iron content of Appellants' alloy and controls over the claimed alloy's other main alloying ranges have resulted in an entirely unexpected surface behavior. For

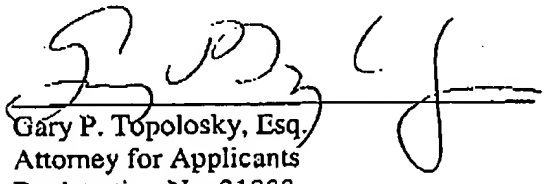
the foregoing reasons, independent claims 1, 12 and 20 are not rendered obvious over the Metals Handbook, alone or in view of Karabin.

Claims 8-11, 13-19, and 21-27 depend directly, or indirectly, from independent claims 1, 12 and 20, respectively and further define the alloy of the present invention and therefore are not rendered obvious.

IX. CONCLUSION

In summary, the claims define a unique higher purity aluminum alloy, a forged aircraft wheel, and a forged vehicular brake component having a reduced susceptibility to high temperature oxidation, increased fracture toughness, as well as tensile elongation properties. With regard to the rejected claims, the Examiner has not addressed all the limitations of the independent claims, nor the corresponding dependent claims. Anticipation requires that the elements of the claim under consideration be described in a single reference. *Glaverbel S.A. v. Northlake Mkt'g & Supp., Inc.*, 45 F.3d 1550, 33 USPQ 2d 1496 (Fed. Cir. F.C. 1995). The Examiner has failed to show disclosure in pp 426-427 and 449-450 of the Metals Handbook of each element of the claims of the present invention. Additionally, in order to establish a *prima facie* case, the Examiner must show that each claim indication is met or made obvious by the applied prior art. MPEP §2143.03 citing *In re Royka LC*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). The Examiner has failed to do so. The preponderance of evidence clearly establishes the allowability of claims 1-27. Reversal of all of the Examiner's rejections and allowance of these claims are respectfully requested.

Respectfully submitted,



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